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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/529,818	03/31/2005	Hiroshi Matsui	Q87174	5691

23373 7590 12/23/2010
SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER	
MOWLA, GOLAM	

ART UNIT	PAPER NUMBER
1723	

NOTIFICATION DATE	DELIVERY MODE
12/23/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

sughrue@sughrue.com
PPROCESSING@SUGHRUE.COM
USPTO@SUGHRUE.COM

Office Action Summary	Application No.	Applicant(s)	
	10/529,818	MATSUI ET AL.	
	Examiner	Art Unit	
	GOLAM MOWLA	1723	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 November 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,6,27 and 34-45* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,6,27 and 34-45* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

FINAL ACTION

Response to Amendment

1. Applicant's amendment of 11/18/2010 does not place the Application in condition for allowance.

2. Claims 1, 6, 27 and 34-34 are currently pending. Applicant has amended claims 1, 6, 27 and 34, cancelled claims 2-5, 7-26, 28-33, and added new claims 35-45.

Status of the Rejections

3. Due to Applicant's amendment of claims 1, 6, 27 and 34, all rejections from the office Action dated 06/18/2010 are withdrawn. However, upon further consideration, a new ground of rejection is presented below.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 35-45 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not

described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 35, 38, 40 and 44 recite the limitation “the counter electrode is not provided with a metal circuit layer”, which is not supported by the original disclosure as filed. Instant disclosure does not preclude the use of metal circuit layer on the counter electrode.

7. Claims 35-45 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 35, 38, 40 and 44 recite the limitation “the counter electrode is not provided with a metal circuit layer”, which renders the claim indefinite. It is not clear whether applicant intended to claim "a metal circuit layer is not provided on the counter electrode layer." Clarification is requested.

Claim 35 recites the limitation "a metal circuit layer" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 38 recites the limitation "a metal circuit layer" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 40 recites the limitation "a metal circuit layer" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 44 recites the limitation "a metal circuit layer" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

8. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

9. Claims 1, 6 and 35-39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kurth (WO 00/48212, refer to US 6,462,266 for translation) in view of Wariishi et al. (US 6,376,765 B1).

Regarding claims 1 and 6, Kurth discloses a photovoltaic cell (1) (fig. 1, 2:26-3:3 and 4:53-63) which reads on instant photoelectric conversion element or dye-sensitized solar cell, comprising:

- an electrode substrate, comprising
  - a base material (support pane 2),
  - a transparent conductive layer (conductor layer 5) which is provided on the base material (2), and
  - a metal circuit layer (conductor lead 7) which is formed on the transparent conductive layer (5),
    - wherein the metal circuit layer (7) is covered by an insulating layer (insulating coating 10) that includes a glass component (glass coating 10) (col. 2, line 45);
- a counter electrode (conductive layer 6), which has a different constitution from the electrode substrate (counter electrode is formed of a single layer 6 whereas electrode substrate is made of plurality of layers, and therefore has a different

constitution), and which is placed facing an oxide semiconductor film (inherent characteristics feature of a photovoltaic cell); and

- an electrolyte layer or charger transfer layer (col. 4, lines 53-63) that is provided between the counter electrode (6) and the electrode substrate (combination of layers 2+5+7+10) (one of ordinary skill in the art realizes that the electrolyte layer is inherently placed between the electrode substrate and counter electrode).

The dye-sensitized solar cell (1) of Kurth inherently has a dye-sensitized semiconductor film which is provided between the electrode substrate (combination of layers 2+5+7+10) and counter electrode (6) (see figure 1 Wariishi which shows that dye-sensitized semiconductor layer is inherently formed between electrode substrate and counter electrode). However Kurth does not explicitly show whether the dye-sensitized semiconductor film comprises a semiconductor porous film that is provided on a side of the electrode substrate above which the transparent conductive layer side is provided, and a sensitizing dye that is provided in the semiconductor porous film, and whether the semiconductor porous film is formed above the electrolyte layer.

Wariishi discloses a photoelectric conversion element or dye sensitized solar cell (1) comprising an electrode substrate (50a and 10a), a counter electrode (40a), a porous semiconductor film (20), a sensitizing dye (22) in the oxide semiconductor porous film (20), and an electrolyte or charge transfer layer (30) being formed of a composition excellent in durability and a charge transporting ability adjacent to the oxide semiconductor porous film (20) provided between the counter electrode (40a) and the electrode substrate (50a and 10a) above which oxide semiconductor porous film (20) is formed.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized the dye-sensitized semiconductor porous film and electrolyte layer of Wariishi in the solar cell of Kurth in order to form the porous semiconductor film and the electrolyte layer above the electrode substrate and between the electrode substrate and counter electrode in order to allow for a device that exhibits excellent conversion efficiency, as taught by Wariishi (examples 1 and 2 as shown in table 3) (col. 67, lines 39-50).

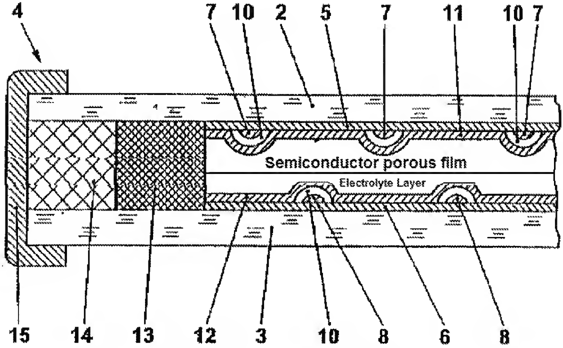

Figure 1: Photovoltaic cell of Kurth in view of Wariishi

Hence, Kurth in view of Wariishi discloses the transparent conductive layer (5) contacts the metal circuit layer (7) inside of the insulating layer (10) and the transparent conductive layer

(5) contacts an electrolyte solution (col. 4, lines 53-63) via the oxide semiconductor porous film (10) (see annotated fig 1 as shown above) and at least a part of the oxide semiconductor porous film contacts the transparent conductive layer (5) outside the insulating layer (10). Annotated figure 1 shows the presence of electrically conductive layer 11, which prevents the direct contact between the transparent conductive layer (5) and electrolytic solution via the oxide semiconductor porous film. However, Kurth explicitly states that the usage of the layers 11 and 12 are optional ("…electrically conductive layer 11, and 12 respectively, … can be applied in order to obtain a still higher yield of the photovoltaic cell 1"). Hence, without the presence of layer 11, the transparent conductive layer (5) physically contacts an electrolyte solution (col. 4, lines 53-63) via the oxide semiconductor porous film (10) (see annotated fig 1 as shown above) and at least a part of the oxide semiconductor porous film directly contacts the transparent conductive layer (5) outside the insulating layer (10).

In an alternative, it would have been obvious to one skilled in the art at the time of the invention to have removed these layers (11 and 12) when the function is not desired (In re Larson, 340 F.2d 965, 144 USPQ 347 (CCPA 1965)) (MPEP § 2144.04 II A). After the removal of layers 11 and 12, the transparent conductive layer (5) physically contacts an electrolyte solution (col. 4, lines 53-63) via the oxide semiconductor porous film (10) (see annotated fig 1 as shown above) and at least a part of the oxide semiconductor porous film directly contacts the transparent conductive layer (5) outside the insulating layer (10).

Regarding claims 35 and 38, Kurth further discloses that the counter electrode (6) is not provided with a metal circuit layer (see fig. 1 which shows that the counter electrode is constituted of only layer 6 and does not contain a metal circuit layer).

Regarding claims 36 and 39, Kurth in view of Wariishi further discloses that the counter electrode (6) is provided onto the electrolyte layer or the charge transfer layer (see annotated figure 1 as shown above). Annotated figure 1 shows the presence of electrically conductive layer 12, which prevents the direct contact between the counter electrode (6) and the electrolyte layer. However, Kurth explicitly states that the usage of the layers 11 and 12 are optional ("...electrically conductive layer 11, and 12 respectively, ... can be applied in order to obtain a still higher yield of the photovoltaic cell 1"). Hence, without the presence of layer 12, the counter electrode (6) directly contacts the electrolyte layer (see annotated fig 1 as shown above). In an alternative, it would have been obvious to one skilled in the art at the time of the invention to have removed these layers (11 and 12) when the function is not desired (In re Larson, 340 F.2d 965, 144 USPQ 347 (CCPA 1965)) (MPEP § 2144.04 II A). After the removal of layers 11 and 12, the counter electrode (6) directly contacts the electrolyte layer.

Regarding claim 37, Kurth further discloses that the insulating layer (10) comprises a material that includes a glass component (col. 2, lines 41-44).

10. Claims 27, 34 and 40-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kurth (WO 00/48212, refer to US 6,462,266 for translation) in view of Wariishi (US 6,376,765), and further in view of Mohri et al (US 4,396,682).

Regarding claims 27 and 34, Kurth discloses a photovoltaic cell (1) (fig. 1, 2:26-3:3 and 4:53-63), which reads on instant photoelectric conversion element or dye-sensitized solar cell, comprising:

- an electrode substrate, comprising

- a base material (support pane 2),
- a transparent conductive layer (conductor layer 5) which is provided on the base material (2), and
- a metal circuit layer (conductor lead 7) which is formed on the transparent conductive layer (5),
  - wherein the metal circuit layer (7) is covered by an insulating layer (insulating coating 10) that includes a glass component (glass coating 10) (col. 2, line 45);
- a counter electrode (conductive layer 6), which has a different constitution form the electrode substrate (counter electrode is formed of a single layer 6 whereas electrode substrate is made of plurality of layers, and therefore has a different constitution), and which is placed facing an oxide semiconductor film (inherent characteristics feature of a photovoltaic cell); and
- an electrolyte layer or charger transfer layer (col. 4, lines 53-63) that is provided between the counter electrode (6) and the electrode substrate (combination of layers 2+5+7+10) (one of ordinary skill in the art realizes that the electrolyte layer is inherently placed between the electrode substrate and counter electrode).

The dye-sensitized solar cell (1) of Kurth inherently has a dye-sensitized semiconductor film which is provided between the electrode substrate (combination of layers 2+5+7+10) and counter electrode (6) (see figure 1-10 of Wariishi which shows that dye-sensitized semiconductor layer is inherently formed between electrode substrate and counter electrode). However Kurth does not explicitly show whether the dye-sensitized semiconductor film comprises a

semiconductor porous film that is provided on a side of the electrode substrate above which the transparent conductive layer side is provided, and a sensitizing dye that is provided in the semiconductor porous film, and whether the semiconductor porous film is formed above the electrolyte layer.

Wariishi discloses a photoelectric conversion element or dye sensitized solar cell (1) comprising an electrode substrate (50a and 10a), a counter electrode (40a), a porous semiconductor film (20), a sensitizing dye (22) in the oxide semiconductor porous film (20), and an electrolyte or charge transfer layer (30) being formed of a composition excellent in durability and a charge transporting ability adjacent to the oxide semiconductor porous film (20) provided between the counter electrode (40a) and the electrode substrate (50a and 10a) above which oxide semiconductor porous film (20) is formed.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized the dye-sensitized semiconductor porous film and electrolyte layer of Wariishi in the solar cell of Kurth in order to form the porous semiconductor film and the electrolyte layer above the electrode substrate and between the electrode substrate and counter electrode in order to allow for a device that exhibits excellent conversion efficiency, as taught by Wariishi (examples 1 and 2 as shown in table 3) (col. 67, lines 39-50).

Hence, Kurth in view of Wariishi discloses the transparent conductive layer (5) contacts the metal circuit layer (7) inside of the insulating layer (10) and the transparent conductive layer (5) contacts an electrolyte solution (col. 4, lines 53-63) via the oxide semiconductor porous film (10) (see annotated fig 1 as shown above) and at least a part of the oxide semiconductor porous film contacts the transparent conductive layer (5) outside the insulating layer (10). Annotated

figure 1 shows the presence of electrically conductive layer 11, which prevents the direct contact between the transparent conductive layer (5) and electrolytic solution via the oxide semiconductor porous film. However, Kurth explicitly states that the usage of the layers 11 and 12 are optional ("...electrically conductive layer 11, and 12 respectively, ... can be applied in order to obtain a still higher yield of the photovoltaic cell 1"). Hence, without the presence of layer 11, the transparent conductive layer (5) physically contacts an electrolyte solution (col. 4, lines 53-63) via the oxide semiconductor porous film (10) (see annotated fig 1 as shown above) and at least a part of the oxide semiconductor porous film directly contacts the transparent conductive layer (5) outside the insulating layer (10).

In an alternative, it would have been obvious to one skilled in the art at the time of the invention to have removed these layers (11 and 12) when the function is not desired (In re Larson, 340 F.2d 965, 144 USPQ 347 (CCPA 1965)) (MPEP § 2144.04 II A). After the removal of layers 11 and 12, the transparent conductive layer (5) physically contacts an electrolyte solution (col. 4, lines 53-63) via the oxide semiconductor porous film (10) (see annotated fig 1 as shown above) and at least a part of the oxide semiconductor porous film directly contacts the transparent conductive layer (5) outside the insulating layer (10).

Kurth further discloses that the insulating layer coating comprises glass coating (col. 2, line 45). However, the reference is silent as to whether the insulating layer coating includes at least one of alumina, zirconia and silica heat-resistant ceramic, and whether the insulating layer contains at least one of silicate, phosphate, colloidal silica, alkyl silicate, and metal alkoxide.

Mohri teaches an insulating layer (glazed ceramic substrate) for use in electronic device comprises a heat-resistant ceramic (alumina) as a main component and further includes colloidal silica (SiO_2) (see abstract, and col. 2, line 26 to col. 3, line 55).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have utilized the insulating coating layer of Mohri in the solar cell of Kurth in view of Wariishi because the insulating layer of Mohri has excellent high-temperature stability (see abstract of Mohri), and also selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945).

Regarding claims 40 and 44, Kurth further discloses that the counter electrode (6) is not provided with a metal circuit layer (see fig. 1 which shows that the counter electrode is constituted of only layer 6 and does not contain a metal circuit layer).

Regarding claims 41 and 45, Kurth in view of Wariishi further discloses that the counter electrode (6) is provided onto the electrolyte layer or the charge transfer layer (see annotated figure 1 as shown above). Annotated figure 1 shows the presence of electrically conductive layer 12, which prevents the direct contact between the counter electrode (6) and the electrolyte layer. However, Kurth explicitly states that the usage of the layers 11 and 12 are optional ("...electrically conductive layer 11, and 12 respectively, ... can be applied in order to obtain a still higher yield of the photovoltaic cell 1"). Hence, without the presence of layer 12, the counter electrode (6) directly contacts the electrolyte layer (see annotated fig 1 as shown above). In an alternative, it would have been obvious to one skilled in the art at the time of the invention to have removed these layers (11 and 12) when the function is not desired (In re Larson, 340

F.2d 965, 144 USPQ 347 (CCPA 1965)) (MPEP § 2144.04 II A). After the removal of layers 11 and 12, the counter electrode (6) directly contacts the electrolyte layer.

Regarding claims 42 and 43, Kurth in view of Wariishi and Mohri further discloses that the insulating layer (10) includes colloidal silica (see above).

Response to Arguments

11. Applicant's arguments with respect to claims 1, 6, 27 and 34 have been considered but are moot in view of the new ground(s) of rejection as necessitated by the amendments.

On pages 9-11 of Remarks, Applicant argues that the prior art of record, alone or in combination, fails to disclose that "the transparent conductive layer contacts the metal circuit layer inside of the insulating layer and the transparent conductive layer physically contacts an electrolyte solution via the oxide semiconductor porous film and at least a part of the oxide semiconductor porous film directly contacts the transparent conductive layer outside of the insulating layer.

This argument is directed to the claim as amended and is moot in view of new ground of rejection as presented above.

Conclusion

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Correspondence/Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GOLAM MOWLA whose telephone number is (571) 270-5268. The examiner can normally be reached on M-Th, 0800-1830 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, ALEXA NECKEL can be reached on (571) 272-1446. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would

like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/G. M./
Examiner, Art Unit 1723

/Alexa D. Neckel/
Supervisory Patent Examiner, Art Unit 1723